TITLE OF THE INVENTION

METHODS AND SYSTEMS FOR COLLATERAL MATCHING AND MARK TO MARKET RECONCILEMENT

PRIORITY APPLICATION

This application claims the benefit of US Provisional Application No. 60/146,569 filed July 30, 1999, entitled "System and Method for Mark to Market Reconcilement," and is incorporated herein by reference.

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BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to the field of collateral matching and mark to market reconcilement that allows parties to a financial transaction to easily, efficiently, and reliably manage the margining process. More particularly, the present invention provides secure, high-volume processing methods and systems for multiple financial instruments that combine collateral matching to identify matched and unmatched financial

transactions and consolidated mark to market valuations for all parties to a matched financial transaction.

2. Background

Financial market participants are constantly aware of the risks and opportunities in the dynamics of the foreign exchange, derivatives market, and securities market. Bilateral margin agreements are dynamic market contracts in which the parties must account for the margin, the variance in value between the contract price and the market price. Subject to market fluctuations, the valuation of the margin by each party is often a source of conflict and tremendous market inefficiency. Whether it is the complexity and volume of the transactions between the parties, the use of different formulae to calculate the value of the transactions, or a combination of the above factors, the disconnect in margin valuation demands a time consuming manual review process that is detail-oriented and error prone. Manually reviewing a difference or discrepancy in the margin valuation keeps the parties from adequately and promptly assessing its business risks and opportunities in a rapidly changing market economy.

Bilateral margin agreements require each party to bear a high level of risk in dealing with the other. The variance of the market and its effect on the margin valuation can create various incentives for a party to take advantage of a favorable market or to remain inactive. The risk is in the party's mark to market valuation of the margin and in the varying market valuation of collateral agreements. Derivative instruments, such as, an interest rate swap, a currency swap, or an interest rate option, pose the greatest risk valuations because they are based on changes in terms of notional amounts and not on exact values.

Typically, a major party, A, such as any major global financial institution or bank, has a significant book (portfolio) of transactions. For example, a particular global bank may have anywhere from one to fifty (50) transactions against a counter-party, B. Those transactions might be booked and they might all be confirmed, but they are for different notional values, different periods of time, and, in fact, some of them may be interest rate swaps and some of them may be currency swaps. Such a portfolio of transactions raises a significant number of risk issues.

One of the risk issues, for example, is the mark to market value of a particular transaction. For example, the interest rate swap transaction that lasts over an eighteen (18) month period has an initial value at financial transaction date. However, because time passes and there is a timed value of money, the value of that transaction changes every day. It changes based on how interest rates change, which is the floating side; it changes based on exactly how time passes; and it also changes based on factors involved with the volatility of interest rates.

The changes can be calculated using, for example, complicated mathematical formulae, but the important factor is that the value of the transaction between A and B is different every day. In a portfolio of transactions, let us say fifty (50) transactions, for different values between A and B, some of these transactions can be in the money and some of them can be out of the money to either party. Generally, these values are netted because the parties have netting agreements established between them. However, the problem remains that it is most likely that one party is going to be net out of the money with the other party.

Assume, for example, that we have fifty (50) transactions in this portfolio between A and B, and that B is $2 million out of the money as of a given day, such as today. This

means that A has at least $2 million of pure, economic risk that if B, for example, becomes bankrupt today, A will not receive these moneys. Therefore, the institution of collateral agreements has become commonplace within the marketplace.

A collateral agreement means that, based on certain parameters, if B is out of the money, such as $2 million, B will post an agreed upon amount of collateral to be held by A until the market changes. The market changes every day, and rather than going through the laborious and inefficient process of margin-call, B sends A collateral, a smaller sum of money, such as, $50,000.00. In other words, until the market changes $50,000.00 back in B's favor, A would keep the collateral. Collateral agreements make sense in continuing business relationships because the changing market conditions make it unreasonable to constantly move money between parties when one party's gains on one day may be losses on the next.

Given the improved efficiencies of collateral agreements over margin-calls, there are still inefficiencies in their use. For example, the amount of collateral must be agreed upon and must be delivered to the proper party. Additionally, the timely movement of collateral between parties can be a source of inefficiency if the parties are unable to agree upon the amount constituting collateral. Further, the difference in how parties mark to market the collateral becomes a critical issue.

Collateral, such as, a government bond is marked to market daily because like any other financial instrument, the value of that bond changes every day. Mark to market is a representation of the daily market value and the changes to those market values over a period of time. When any A has multiple collateral agreements with multiple parties, the portfolio of transactions typically includes a variety of different types of transactions, such

as, foreign exchange forwards, interest rate swaps, and currency swaps. Accordingly, there is a myriad of bilateral margin agreements in place.

The current process of reconciling these types of financial transactions is manually intensive, extremely time consuming, and tedious. For example, when A and B have 500 transactions, it can take up to six months just to reconcile those transactions, because transactions are maturing and new transactions are entered into. Some of the transactions may be rather complex and may be under limited control in manual spreadsheets. When these transactions are handled on a manual basis, the mark to market updates can be made on an irregular and unsynchronized schedule, thus causing a disparity in the margin valuation and inefficiency incurred through the review process. At a high level of volume, the process becomes untenable, inefficient, and error prone.

The ability to reconcile a specific transaction that A is valuing and that B is also valuing is further affected by the likelihood that the two parties are not using exactly the same formulae for creating the value of that transaction. Without an established or agreed upon standard of formulae for calculating the margin, there will always be differences of opinion between A and B, although hopefully minor, as to what the value of a particular transaction is on any given day. Therefore, in addition to agreeing between parties A and B that these transactions exist and that the components of the transactions are equal, it is also necessary to mark to market the value of a particular transaction from both sides on a given day's basis and to reach an agreement on the net value of all transactions.

Thus, a need exists for a methods and systems for remotely accessing a secure communications network that provides parties a single point of entry to electronically process collateral matching and mark to market valuations of multiple financial instruments in numerous financial transaction. A need also exists for collateral matching

and mark to market methods and systems that afford basic checks on financial transaction data and that prevents duplicate submission of this data. There is a further need for flexible collateral matching and mark to market methods and systems that are able to: (1) provide real-time identification of matched and unmatched financial transactions; (2) provide real-time mark to market portfolio valuations; (3) provide standard formulae and user preferences to develop algorithms for real-time mark to market portfolio valuations; (4) minimize manual review of discrepancies in margin valuations; (5) accommodate additional financial instruments and additional users as the system expands; (6) facilitate lower financial transaction and processing costs; (7) provide multilingual capabilities, settlement currencies, and other identifiers necessary to globally communicate with users interested in collateral matching and mark to market portfolio valuations; and (8) minimize the manual entry and re-keying of information into multiple formats and templates used by parties to a financial transaction.

SUMMARY OF THE INVENTION

To overcome the aforementioned problems, the present invention provides an easy, efficient, and reliable standard for parties to efficiently, accurately, and immediately evaluate its relative market positions by providing methods and systems for collateral matching and mark to market valuations of multiple financial transactions. The system utilizes computer hardware and software and makes use of a number of key components, such as a data translation engine, a matching and reconciliation engine with bilateral capabilities, and a client-side reporting administration system using web-based technology. In a secure interface via encrypted and authenticated file transfers, the methods and systems for an embodiment of the present invention enable any execution

confirmation matching system to feed the results of a matched transaction to the mark to market reconcilement system to collaterally match and to derive mark to market valuations.

In an embodiment of the present invention, financial transaction data is transmitted using web-based technology or using a computer-to-computer interface (e.g., a direct link to a broker's order capture system). The financial transaction data transmitted by a party is formatted to FIX, SWIFT, or another standard electronic format. Once in a standard format, the transaction data is transmitted and stored to a communications network that any party can access to track the status of the collateral matching and mark to market valuations and to report on exception items.

In an embodiment of the present invention, the methods and systems consist of one or more client terminals that works in conjunction with a communications network(s), network server(s), and database(s). The client terminal is an interactive electronic communications device, such as, for example, PC's and/or servers running UNIX or LINUX, a Macintosh, a personal digital assistant (PDA), a pen-based computer, an interactive pager, mobile and cellular phones, a WAP phone, an interactive television, and the like. The client terminal gets all the data it needs to display "user modules" that represent screens displayed on a client terminal and allows a user to view, input, select, and/or transmit financial transaction data, including user instructional data. For example, instead of a party manually reviewing portfolio accounts to determine matched financial transaction and mark to market valuations, financial transaction data is transmitted in an electronic transfer medium, such as, an interactive web-page. The financial data standardized, verified, stored, identified as matched, unmatched, or marked as an exception. Thereafter, mark to market valuations of the

transaction data are automatically performed using algorithms of standard formulae and user instructions.

In an embodiment of the methods and systems of the present invention, web-browser/web-server technology can be used in a GUI application to generate, access, and download client reports, and act as an administrative interface. The web-browser is used to deliver a client report to provide the following information: total mark to market valuation, matched financial transactions, unmatched financial transactions, import errors, and other information as required. In an embodiment of the present invention, the web-browser further enables users to generate and transmit administrative instructions for file transfer. The user is able to link and unlink financial transactions, manually match and unmatch financial transactions, add or amend product codes and parties, upload financial transaction data files, download results data, and manage other administrative portfolio tasks.

In an embodiment of the methods and systems of the present invention, a server side data translation engine can translate a party's financial transaction data into a standardized format through data parsing, validation, and format conversion. All file imports are logged and time-stamped in order to provide a complete history and audit trail. Any errors encountered in the import process are logged and written into a database unless primary key data is missing. In another embodiment, this engine offers the flexibility of creating new import specifications and modifying existing ones in order to accommodate new file formats and changes in data content.

In an embodiment of the present invention, the data translation engine feeds the standardized data to a separate server side engine with bilateral capabilities to match and reconcile financial transactions. This matching and reconciliation engine updates existing

financial transactions and inserts any new financial transactions. Specifically, existing unmatched financial transactions are updated with the latest data and existing matched financial transactions are updated to the latest mark to market value. Any other variable fields deemed necessary are also be updated. The system then attempts to match any new financial transactions that have arrived. On a periodic basis set by the user, the system will carry out the reconciliation process for all matched financial transactions that have been updated in the previous period.

In another embodiment of the invention, software encryption and authentication is accomplished using something akin to the concept of having public and private keys. The security system generates a pair of linked keys -- one of which is public and the other is private. The public key is used to generate an encrypted file and can only be decrypted by using the private key. The public key is thus distributed by a party to another party (e.g., counter-party) that it wishes to exchange encrypted data.

In addition to providing the methods and systems outlined above, the present invention: (1) provides highly configurable data import/export specifications; (2) standardizes data formats data; (3) facilitates automatic file transfer; (4) provides near real-time mark to market comparisons of selected financial transaction valuations; (5) allows a user to define decision making criteria to reconcile the mark to market value of matched transactions; and/or (6) notifies each party of new financial transactions.

In another embodiment of the present invention, the methods and systems may be utilized to perform one or more of the following tasks: (1) utilize a user-friendly interactive user interface; (2) provide integration with external and internal systems; (3) provide detailed reports; (4) allow for real-time system modifications and system

configuration; (5) allow for customized import/export files; and/or (6) utilize state-of-the-art communications technology.

Further details on these embodiments, other possible embodiments, and additional methods and systems of the present invention are set forth below.

As are appreciated by those of ordinary skill in the art, the methods and systems of the present invention have wide utility in a number of areas as illustrated by the wide variety of features and advantages discussed below.

It is a feature and advantage of the present invention to provide methods and systems of automatically collecting and distributing collateral mark to market valuation reconcilement information associated with a financial transaction that provide real-time notification of all valuation changes to parties to a financial transaction.

It is another feature and advantage of the present invention to provide methods and systems for automated collateral matching and mark to market reconcilement with a global reach that reduces manual activity, expands productivity, and acts as a bridge to both confirmation and depository systems.

It is another feature and advantage of the present invention to import and store financial transaction data feeds by remote booking/accounting systems and to allow all parties to a transaction to be aware of a new transaction whenever the transaction is uploaded.

It is another feature and advantage of the present invention to access, convert, manage, store, and transmit electronic financial transactional data associated with collateral matching and mark to market valuations.

It is another feature and advantage of the present invention to enable parties in a transaction to establish norms and other reconcilement criteria, and, to thereby, monitor mark to market values with more certainty.

It is another feature and advantage of the present invention to allow the use of different reconcilement algorithms or sets of algorithms among parties to a financial transaction.

It is another feature and advantage of the present invention to evaluate data fields in a financial transaction and to match financial transactions based on data tolerances and/or user preferences.

It is another feature and advantage of the present invention to evaluate date fields in a financial transaction and to match financial transactions based on date tolerances and/or user preferences.

It is another feature and advantage of the present invention to evaluate number fields in financial transaction data and match transactions based on number tolerances and/or user preferences.

It is another feature and advantage of the present invention to reduce costly exception processing associated with collateral matching and mark to market valuations.

It is another feature and advantage of the present invention to generate key financial reports that a party can use to monitor and control portfolios of collateralized agreements and other bilateral margin agreements.

It is another feature and advantage of the present invention to eliminate the need for customers using a depository or collateral agent to re-key daily data.

It is another feature and advantage of the present invention to make file hand-offs automatic.

It is another feature and advantage of the present invention to convert data into a standardized format.

It is another feature and advantage of the present invention to provide flexible data conversion parameters.

It is another feature and advantage of the present invention to authenticate, verify, and confirm mark to market parameters and financial transaction data to reconcile matched financial transactions.

It is another feature and advantage of the present invention to automatically export financial transactional data to multiple users, including buyers, sellers, and third parties (e.g., collateral agents, depositories, etc.).

It is another feature and advantage of the present invention to provide detailed audit reports to capture the actions, events, errors, and the like involved in the import and/or export of data, in the internal processing of data, and in the manual matching and reconcilement processes.

It is another feature and advantage of the present invention to provide security, authentication, and entitlement features.

It is another feature and advantage of the present invention to allow a party to enter and submit financial transaction data and to modify previously submitted financial transaction data.

It is another feature and advantage of the present invention to provide a flexible collateral matching and mark to market system that is capable of accommodating changes in the system architecture.

It is another feature and advantage of the present invention to accommodate growth in the number of users (e.g., parties, system administrators, etc.).

It is another feature and advantage of the present invention to provide a collateral matching and mark to market system that is capable of running on many different hardware platforms and with many different operating systems.

It is another feature and advantage of the present invention to interface and communicate with the network communications system through a variety of electronic mediums, including wireline and wireless technology, such as, for example, WAN, LAN, PSTN, public networks, satellite systems, and the like.

It is another feature and advantage of the present invention to provide on-line system help to the user.

It is another feature and advantage of the present invention to provide for multiple levels of user access and to facilitate multiple levels of security related to those levels of user access.

It is another feature and advantage of the present invention to secure the source code on the network server and/or communications network.

It is another feature and advantage of the present invention to provide a user with access to a variety of optional additional useful administrative features, such as, for example, changing a password, adding a financial instrument, and setting defaults.

It is another feature and advantage of the present invention to have one standardized user interface regardless of a user's computer system (i.e., the hardware platforms, operating systems, programming languages, software applications, and other computer technology).

It is another feature and advantage of the present invention to allow a user to store data on a local computer or local network.

It is another feature and advantage of the present invention to provide multilingual capabilities including translations of financial transaction data, including mark to market data and user data.

It is another feature and advantage of the present invention to allow a user to select a language (e.g., English, French, Spanish, German, etc.) to display user module information, including data that is uploaded or downloaded by a user.

It is another feature and advantage of the present invention to allow for single data entry in order to eliminate the mistakes caused by the re-entry of data by multiple users, and accordingly, to reduce the need for personnel to enter financial transaction data and reconcilement data.

It is another feature and advantage of the present invention to significantly reduce the time required by the overall reconcilement process.

These advantages and features may be accomplished singularly, or in combination, in one or more of the embodiments of the present invention.

Additional uses, objects, advantages, and novel features of the invention are set forth in the detailed description that follows and will become more apparent to those skilled in the art upon examination of the following or upon learning by practice of the invention.

BRIEF DESCRIPTION OF THE FIGURES

Other advantages and features of the invention are more clearly understood by reference to the following description taken in connection with the accompanying figures, in which:

Figures 1A, entitled "MTM Reconcilement Topology Overview," and 1B, entitled "MTM Reconcilement System Schematic," illustrate overviews of the reconcilement topology and system schematic in one or more embodiments of the methods and systems for collateral matching and mark to market reconciliation.

Figure 2, entitled "Overview - Mark to Market Valuation," illustrates an overview of the mark to market valuation process flow in an embodiment of the methods and systems for collateral matching and mark to market reconciliation.

Figure 3, entitled "Financial Transaction Data Flow," illustrates the financial transaction data flows in an embodiment of the methods and systems for collateral matching and mark to market.

Figure 4, entitled "Daily Transaction Reconcilement Flows," illustrates the daily process flows in an embodiment of the methods and systems for collateral matching and mark to market.

Figure 5, entitled "Exposure Summary Report for Bank No. 1," illustrates a sample Exposure Summary Report in an embodiment of the methods and systems for collateral matching and mark to market reconciliation.

Figures 6A-D, entitled "Data Table for Matched Financial Transactions," illustrate sample data for matched financial transactions in an embodiment of the methods and systems for collateral matching and mark to market reconciliation.

Figure 7, entitled "Data Table for Unmatched Financial Transactions," illustrates sample data for unmatched financial transactions in an embodiment of the methods and systems for collateral matching and mark to market reconciliation.

Figure 8, entitled "Data Table for Expired Financial Transactions," illustrates sample data for expired financial transactions in an embodiment of the methods and systems for collateral matching and mark to market reconciliation.

Figure 9, entitled "Import Errors Bank No. 2," illustrates a sample Import Error Report in an embodiment of the methods and systems for collateral matching and mark to market reconciliation.

Figure 10, entitled "International Swap Dealer Association (ISDA) Agreement Matrix," illustrates a sample ISDA agreement matrix in an embodiment of the methods and systems for collateral matching and mark to market reconciliation.

Figure 11, entitled "Sample Input Data Files - Three (3) Types of Input Formats," illustrates sample input data files in an embodiment of the methods and systems for collateral matching and mark to market reconciliation.

Figures 12A-D, entitled "File Import Specification," illustrates samples of file import specifications in an embodiment of the methods and systems for collateral matching and mark to market reconciliation.

Figure 13, entitled "Matching Criteria," illustrates data tables of matching criteria data fields in an embodiment of the methods and systems for collateral matching and mark to market reconciliation.

Figures 14A and 14B, entitled "Tables of Data Fields," illustrate sample tables of data fields in an embodiment of the methods and systems for collateral matching and mark to market reconciliation.

DETAILED DESCRIPTION

The essence of the present invention is to automate the collateral matching and derivative mark to market (MTM) reconcilement process by accepting one or more files of financial transaction data from numerous parties and to produce market valuations and reports that enable each party in a multi-party financial transaction to agree and adjust its relative collateral positions simply and quickly. The present invention is related to, but remains independent of, any execution confirmation matching system.

The system reconciles the MTM value of multiple financial instruments. Any financial instrument (e.g., interest rate swaps, currency swaps, interest rate options, non-delivery versions of foreign exchange related products, etc.) may be matched and reconciled. In an embodiment, the present invention reconciles matched financial transactions that are handed-off by a party such that the financial transaction data can be accepted without the need for re-matching.

The present invention will now be described in more detail by illustrative examples with reference to the embodiment(s) depicted in the Figures. The following described embodiment(s) is presented by way of example and should not be construed as limiting the inventive concept to any particular configuration.

Referring to Figures 1A and 1B, a basic overview of the mark to market (MTM) topology and system schematic is depicted. As shown in Figure 1, a client terminal **101a, 101b** or a server **102** is connected over a secured firewall **105** to a communications network **160**. The communications network **160** includes a secured web-server **106**, a data parser/translator **107**, a reports generator **108**, a transaction processor **109**, and a MTM processor **110**. Daily MTM values **162**, MTM reports **163**, and a web-transactor **161** are maintained and communicated via the communications network. Further, the

communications network **160** is coupled over a secured firewall **111** to a transaction database **112** and a database containing customer records **113** (e.g., records containing profile data of each party, financial service provider, etc.). Depositories or other third parties **170** may also be connected and have access to information in the communications network **160**.

Transmission Control Protocol/Internet Protocol (TCP/IP) **104** may be utilized over a virtual private network wherein a user can dial in through a modem, over integrated services digital network (ISDN), or over a fixed line, such as, for example, a leased line to access the communications network **160**. Alternatively, the system operates over the Internet using a web-browser **103** with suitable bridges and security.

The collateral matching and mark to market system includes at least one client terminal **101a, 101b**. The client terminal **101a, 101b** typically includes a central processing unit (CPU), a monitor or other visual display device, a keyboard or some other input device, and a communications device. Client terminals **101a, 101b** transmit and receive data to and from a server **106** via a communications network **160**. Client terminals **101a, 101b** interact with the server **106** in a typical client/server platform. The operation of the system according to the embodiment shown in Figure 1 is as follows. A party at a client terminal **101a** accesses the communications network and transmits financial transaction data, including financial data and user profile data. The server **106** either creates a new object in the software or modifies an existing object to standardize and store the financial transaction data. Thereafter, the financial transaction data is automatically matched and reconciled using parameters specified by a party. A counter-party sitting at another client terminal **101b** can then enter the system and access the uploaded financial transaction data and results including matched transactions and mark to market valuations for specific financial instruments.

In a possible embodiment of the present invention, the client terminal **101a, 101b** may be any PC running a Windows operating system or may be a Windows NT workstation with access to a global communications network **160**, such as, the Internet. For example, the client terminal **101a, 101b** may be a PC that supports either Internet Explorer or Navigator to provide access to the Intranet or Internet. Alternatively, it should be appreciated that the client terminal **101a, 101b** could take on a variety of other suitable forms, such as, for example, PC's and/or servers running UNIX or LINUX, a Macintosh, a PDA, a pen-based computer, an interactive pager, mobile and cellular phones, a WAP phone, an interactive television, and the like. Furthermore, the client terminal could be electronically connected to a communications network **160** by way of other wireline or wireless technology, including, for example, WAN, LAN, PSTN, public networks, satellite systems, and the like.

In an embodiment of the present invention, the client terminal **101a, 101b** displays user modules that represent screen shots and prompts the user to view, input, export, select, and/or transmit various information about financial transactions, user information, collateral matching criteria, other decision making criteria, and mark to market valuations. The user modules may be advantageously displayed as web-page projected upon a client terminal **101a, 101b** running a web-browser **103** coupled with to a communications network **160**.

Figure 2, entitled "Overview - Mark to Market Valuation," illustrates an embodiment of the mark-to-market process flow between the parties **201, 221** after the financial transactions are input and matched **211** within the system. After each specified period of time, usually once daily, all derivative transactions are marked to market **202, 222** by a party **201, 221**. Each party's formulae may be different and proprietary. As a

contributing member of the system, each party **201, 221** runs their proprietary MTM systems **202, 222** to value their transactions.

Then, the results of these MTM bookings **202, 222** are fed in a known file format **203, 223** to the formatting module **210**. Both parties may prepare and send their MTM values in different formats. The data is then parsed and translated to a standardized format **210** and transmitted to the MTM processor **211**.

Next, the transactions containing the newly updated MTM values are matched by the transaction processor **212** against the data contained in the transaction database **213**. Thereafter, the current MTM values replace the last set of MTM values. This occurs for each party that submitted MTM values, including revised MTM values.

The MTM processor **211** generates the reports for each party's transactions versus those of the appropriate counter-party, such that if all parties submitted revised MTM values, a complete set of valuations for each party's portfolio of transactions would result.

Each party **201, 221** is able to access the reports via a communications network **204, 224** and can electronically export the data to be used either as input to their own collateral management systems **205, 225** or to the system of the depository **206, 226** managing their collateral portfolio. The data may also be printed out in a multitude of user specified reports.

Figure 3, entitled "Financial Transaction Data Flow," illustrates the financial transaction data flows in an embodiment of the methods and systems for collateral matching and mark to market valuation. Note that the financial transaction depicted in Figure 3 is a trade. A party inputs or uploads data files **301** to the system and the system parses, maps, translates, and enriches the data files into a standard format **302**. The data files may be used to update and insert financial transaction data for unmatched financial

transactions **303**, and is then used to match a financial transaction **304**. Alternatively, the data files may be used to update the mark to market value of a matched financial transaction **304**. After a transaction is matched **304**, the system reconciles the mark to market value and transmits the output into a report format **305** that can be output or downloaded to a party's PC or computer information system **306**.

Figure 4, entitled "Daily Transaction Reconcilement Flows," further illustrates the daily transaction reconcilement flows in an embodiment of the methods and systems for collateral matching and mark to market. A party exports data to a standard format **401** which is encrypted using public key and other security precautions **402**. Thereafter, the data is transmitted to a server **403**, and the "transaction" process begins. The data is monitored on the server **410** and translated and copied to a data file **411**. The data file is decrypted and authenticated **412**, and then imported, updated, and matched with other financial transaction data **413**. The system runs a reconcilement process **420** for the matched transactions and exports the results to each party in an encrypted format **421**. A party can access the server **440** and receive the results of the matching and the mark to market reconcilement process. The server or software running on the party's local computer system decrypts and authenticates the results **441** and imports the results to the party's local computer system **442**.

As illustrated in Figures 3 and 4, a key aspect of present invention is to capture financial transactions that both parties, such as parties A and B, have agreed upon in terms of the financial transaction data. This also assures that both parties are simultaneously aware of new transactions. If the transactions are fed by remote booking systems, this can occur when the transaction is booked. The methods and systems for an embodiment of the present invention assist both parties in establishing reconciliation norms and then in

monitoring the mark to market values with more certainty, reducing costly exception processing on all sides, which is the main engine for change in this particular marketplace.

Currently, the fact is that the exception processing requirements are extremely onerous on all parties. The methods and systems for an embodiment of the present invention requires little or no reprogramming of customer systems. The system for an embodiment of the present invention generates reports in an on-line mode that are available to users and that display key financial information that the collateral units of individual users can use to monitor and control their portfolios of collateralized agreements and the transactions covered by those agreements with a certainty that the parties are using the same formulae.

An embodiment of the present invention provides a global system that reduces manual activity while expanding productivity and acts as a bridge to any confirmation system or systems, as well as to some depository systems. Assume four parties, such as parties A, B, C, and D, which can all be, for example, financial institutions, such as, banking institutions. Most complex transactions, such as swap type transactions are, in fact, executed between two financial institutions. Party A can be one financial institution, and B can simply be a different financial institution. Parties B, C, and D can be, for example, the three largest counter-parties to A's interest rate swaps book. They are not restricted as to geography or the like.

If A has collateral agreements, for example, with parties B, C, and D, and B has agreements, for example, with parties A, C, and D, and so on, there is a whole series of bilateral, collateral agreements between these four parties. In an embodiment of the present invention, transactions are marked to market nightly, for example, within A's mainframe or A's server (or B's server or C's server or D's server). Once this is

completed, they feed via a secure high volume line the transaction identifications and the mark to market values for those transactions to the system for an embodiment of the present invention.

In the aforementioned embodiments, a user inputs files (files that are provided by parties A, B, C, and D) of financial transaction details and of the mark to market values associated with those financial transactions. This can be a daily (or more frequent) data feed that includes an identification portion and a mark to market portion of the feed. The system for an embodiment of the present invention takes this feed, translates the data to a common format, and then parses it, and validates that, in fact, the system has reconciled the transaction. If the system has not reconciled the transaction, the system parses it, maps it into the language that the reconcilement system understands, and then performs a reconcilement, for example, against client B's input files.

Therefore, the system translates all of the financial transaction data, for example, of today's financial transactions in standard form and goes through a matching routine, as opposed to a confirmation routine, to see, for example, if B has input B's side of this particular transaction. Once that reconciliation process takes place, then, for example, for the next day's feed, the only information the system actually parses out is the new mark to market value.

In an embodiment of the present invention, the output files are, in fact, web-enabled. Effectively, they are portfolio reports that the system allows the customer to access and to see what their mark to market values are versus, for example, any B, or any C or D, and so on, and likewise, with any of the other parties. Thus, the parties can see what their netted value of portfolio transactions is versus other individual counter-parties. By enabling the parties to do this, they can determine very quickly whether or not more or

less collateral is required, and whether, in fact, there is a change of collateral required under the terms of the collateral agreement. It is extremely important in a collateral agreement to have current and accurate mark to market values against the collateral agreement to reduce risks for each of the parties, and the methods and systems for an embodiment of the present invention provide a means to reduce such risks.

The complexities of the process are multiplied by the fact that many of these financial institutions have what are known as global books. A global book means that certain transactions are booked, for example, in the United States; other transactions of the same portfolio against B may be booked in the United Kingdom, and still other transactions may be booked in Singapore for, example, against Asia Pacific counter-parties. When dealing with a bilateral agreement, it means dealing with a netted totality of those transactions versus the same totality of any B. This requires, basically, a 24 hour by 7 day capability, so that a financial institution with a global book is always updating its mark to market values against a party, against the global book of transactions.

Currently, all counter-parties basically deal on a bilateral basis, many of them on a manual basis. The methods and systems for an embodiment of the present invention, provides a 24 hour by 7 day platform with a web-enabled capability of reviewing portfolios of mark to market values to any party anywhere in the world. An embodiment of the present invention includes, for example, a number of major aspects. One aspect, for example, is the matching and reconciliation aspect. Once a transaction has been matched and reconciled in a transaction between parties, such as A and B, another aspect of an embodiment of the present invention, for example, is that then the system is able to take and parse an updated mark to market valuation against those matched transactions and perform mathematical calculations to create a netted value against those transactions. Still

another aspect for an embodiment of the present invention is to enable a customer to review and receive on-line reports of the customer's global portfolio. This is done at a server level, in which the client is enabled to access the server for an embodiment of the present invention from their local PC and review their positions.

Another function that a party has is the ability to export financial transaction data on the system by a counter-party into another spreadsheet. A party can download the data into his or her booking/accounting system and generate his or her own spreadsheet. The client application (e.g., GUI) for an embodiment of the present invention can be programmed to take on most any format of spreadsheet that a party utilizes. In this way, a party can import their latest financial transactional data every morning into the system and make it available to any counter-party that access the system.

Referring now to Figure 5, entitled "Exposure Summary Report for Bank No. 1," a sample Exposure Summary Report is provided to illustrate a report in an embodiment of the methods and systems for collateral matching and mark to market reconciliation. The sample report represents the exposure of one party, represented by Bank 1, to two or more other parties, represent by Bank 2 and Bank 3.

The exposure that Bank 1 has to the others is separated between those transactions that are matched, for instance between Bank 1 and Bank 2, and those that are not matched between Bank 1 and Bank 2. Each bank's transaction values are accumulated for that portion of the portfolio that is matched and unmatched. The individual net sums mean that when all transactions are summed, keeping mind of the sign of the value according to that parties MTM value, the net exposure of Bank 1 to Bank 2 can be visually depicted. In this illustration, Bank 1 has a 21,214,590.41 total positive exposure to Bank 2; Bank 2 has a total negative exposure to Bank 1 of 41,281,764; and the total net exposure that

Bank 2 has to Bank 1 is 20,067,173.59. This is repeated for each counter-party that Bank 1 has exposure to or from.

Figures 6A-D, entitled "Data Table for Matched Financial Transactions," illustrate sample data for matched financial transactions in an embodiment of the methods and systems for collateral matching and mark to market reconciliation. The present invention matches all transactions input by each bank to the other.

Figure 6A represents the matched transactions between Bank 1 and Bank 2. The table displays all data for both banks that represent the matching criteria. Once a financial transaction is matched, the two sides of the matched transaction are given a unique identifier known as the "Recon Matching ID" that remains for the life of the matched transaction. Figure 6B is a continuation of Figure 6A so that the totals are displayed. The totals include the number of records and the net sum of the mark to market values of matched trades.

Figure 6C shows similar matched trades between Bank 1 and Bank 3. Figure 6D is a continuation of 6C so that the totals are displayed, as in Figure 6B. This particular example shows a net negative mark to market value from Bank 1 to Bank 3.

Figure 7, entitled "Data Table for Unmatched Financial Transactions," depicts an unmatched financial transaction table representing two parties, Bank 1 and Bank 2. All transaction data is displayed so that Bank 1 can use this table as a worksheet when reconciling with Bank 2. All transactions are viewed from the point of view of Bank 1, although the system knows that the counter-party for each of the transactions represented is Bank 2.

Figure 8, entitled "Data Table for Expired Financial Transactions," illustrates sample data for financial transactions that have expired or matured. The table displays all

expired transaction where Bank 1 is one party and Bank 2 is the counter-party. The table is divided by those transactions denominated in United States Dollars (USD) and those denoted by other currencies.

Figure 9, entitled "Import Errors Bank No. 2," illustrates financial transaction data submitted by one party, Bank 2, that failed validation checks and was subsequently rejected. Financial transaction data may be rejected because the data file doesn't contain certain required fields or because certain fields contain specific data formats. This table includes all rejections with the appropriate error messages.

Figure 10, entitled "International Swaps Dealers Association (ISDA) Agreement Matrix," illustrates a sample ISDA Agreement Matrix in an embodiment of the methods and systems for collateral matching and mark to market reconciliation. The ISDA is an industry managed association that creates and maintains standards for how financial transactions are processed by all parties. These standards are different for each type of financial instrument, and likewise there are different standards of documentation for each type or class of financial transaction.

The ISDA Agreement Matrix shows that any party can have different agreements or versions of the agreements with different counter-parties, depending when the agreements were negotiated. The ISDA matrix serves as the baseline for the present invention to recognize the terms under which the financial transaction is processed.

Figure 11, entitled "Sample Input Data Files,' illustrates three sample input data file formats in an embodiment of the methods and systems for collateral matching and mark to market reconciliation. The three formats include:

- Tab Delimited
- Fixed Format
- Tab Delimited with Headings.

Figures 12A-D, entitled "File Import Specification," represent examples of inputs that have been stripped from the formats provided by the inputting party and that are translated to the standard mark to market reconcilement format.

Figure 13, entitled "Matching Criteria," illustrates a data table of matching criteria in an embodiment of the methods and systems for collateral matching and mark to market reconciliation. In this embodiment, the present invention uses field matching criteria to match financial transactions from two or more parties. Some fields require exact matches, while others may have tolerances. For example, data that shows a date for party A that is one day different from the corresponding date for party B may still be considered as a matching date.

There are also different levels of matching. For example, two parties may bilaterally determine a very lenient matching criteria that is categorized by the system as a "Level 3" matching criteria. In this instance (i.e., Level 3), many fields require exact matches, but the maturity date of the transaction could be different by ten days for a transaction between the two parties and still be considered a matched trade.

Figures 14A and 14B, entitled "Tables of Data Fields," illustrate sample financial transaction data tables that specify the field names, the data type within the field, and the maximum data length of the field.

The foregoing description and associated figures detail only illustrative examples of the environment in which the invention can be used and are not intended to be limiting. For instance, data fields and attributes can be constantly updated and added by authorized users (e.g., parties, system administrators, financial service providers, etc.). Furthermore, the programming languages, software platforms, operating systems, hardware components, communications protocols, and other technology mentioned in the foregoing

description are by way of example only, and the present invention may always be enhanced to incorporate the most advanced available technology. Variations and modifications of the present invention is apparent to one skilled in the art, and the above disclosure is intended to cover all such modifications and equivalents.

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